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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/806,936

04/06/2001

Laurent Potin

205507US2XPC

7884

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7590

01/13/2004

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EXAMINER

AMARI, ALESSANDRO V

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 01/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/806,936

Applicant(s)

POTIN ET AL.

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amdt of 10/14/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14, 16-23, 25, 26 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14, 16-23, 25, 26 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 14 October 2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 14, 16-23, 25, 26 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 14 and the claims dependent therein, the recitation of a first intermediate image is still believed to be misdescriptive of the invention. The specification and drawings do not teach light to originate from eyepoint 3. Rather, the present disclosure teaches light to be emitted from the imager (i.e., screen 20) to ultimately impinge on eyepoint 3. Although the arrangement of elements may be described with respect to the eyepoint 3, light does not actually traverse the optical system in this "reverse" direction. Thus, the intermediate image 25 is not formed by off-axis spherical mirror 1 as recited in claim 14.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 14, 16, 20, 23 and 25, 26 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood US Patent 4,763,990.

In regard to claim 14, Wood discloses (see Figure 2) an optical device for a helmet viewfinder presenting a collimated image to a user, comprising: an imager (20a) and an off-axis spherical concave mirror (12) forming a first intermediate image located with respect to the user; a diffractive field mirror (28) for correcting distortion of an image presented to the user which is due to the off-axis spherical concave mirror wherein the distortion corrected by the diffractive field mirror is an off-centering distortion of the second kind corresponding to an absence of symmetry of revolution caused by the spherical concave mirror being viewed at an oblique angle with respect to an axis of the spherical concave mirror as described in column 3, lines 10-40, and wherein the diffractive field mirror is situated in a vicinity of a second intermediate image (54) located with respect to the user and reflected by said diffractive field mirror, the vicinity having an extent limited to a maximum distance of the image beyond which resolution of the image at a center of a field of the device is degraded. Although the prior art does not specifically disclose correcting off-centering distortions, this feature is seen to be an inherent teaching of that device since the device has an off-axis mirror,

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which creates a misshaping of the image, and the device corrects for this negative distortion in order to present a proper image to the observer. Furthermore, it should be noted that the position at which the diffractive field mirror (28) is positioned is a maximum beyond which degradation will occur. In that, Wood teaches (see column 4, lines 12-20) that in order to produce a non-aberrated image to the pilot then the relay optics (26) must cooperate with the diffractive field mirror to form a preaberrated or intermediate image (54). Therefore this position is limited to the maximum distance from the intermediate image in order that the image not be degraded. Examiner would further note that the recitation of the first intermediate image is not distinctly claimed due to the ambiguity as to how the intermediate image is formed (see 112 rejection above).

Regarding claim 16, Wood discloses that the diffractive mirror is placed said maximum distance from the second intermediate image as described in column 4, lines 12-29. (See note for claim 15 above in regard to position of diffractive mirror).

Regarding claim 20, Wood discloses that the diffractive field mirror is a volume hologram recorded in a photosensitive material as described in column 3, lines 36-40 and column 6, lines 3-24.

Regarding claim 23, Wood discloses a power group placed between the spherical mirror and diffractive mirror which focuses the first intermediate image (54) in proximity to said spherical mirror onto the second intermediate image as shown in Figure 2.

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Regarding claim 25, Wood discloses (see Figure 2) that one or more optical power groups or optical relay groups (26) placed in a path of rays between the imager and the spherical mirror, upstream and/or downstream of the diffractive mirror, the one or more optical power groups comprising one or more lenses, at least one lens of which is convergent so as to give an aperture of the beams incident on the diffractive mirror which is smaller in comparison with an aperture of the beams incident on the spherical mirror as shown in Figure 2 and as described in column 4, lines 30-54.

Regarding claim 26, Wood discloses that the spherical mirror is semitransparent as described in column 8, lines 3-7.

Regarding claim 28, Wood discloses that the diffractive field mirror is disposed so as to be antiparallel with the second intermediate image as shown in Figure 2.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood U.S. Patent 4,763,990 in view of Chen et al. U.S. Patent 5,436,763.

Regarding claims 17, 18 and 19, Wood teaches the invention as set forth above as well as teaching (in regard to claim 19), that a face of a support of the diffractive field mirror in which the hologram is made is not planar as described in column 6, lines 15-19. However, Wood does not disclose that the diffractive field mirror is a digital plane

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numerical hologram with discrete variations or that the diffractive field mirror is a plane numerical hologram with a continuous profile. Chen et al. does teach that the diffractive field mirror is a plane numerical hologram with a continuous profile and that the diffractive field mirror is a plane numerical hologram with a continuous profile as described in column 4, lines 27-31. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the holograms as taught by Chen et al. in the device of Wood in order to provide the diffractive properties.

8. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood U.S. Patent 4,763,990 in view of Wood et al. U.S. Patent 4,582,389.

Regarding claims 21 and 22, Wood '990 teaches the invention as set forth above but does not teach that the photosensitive material is on a transparent support of variable optical index or that the photosensitive material is on a transparent support of variable thickness. Wood et al. '389 does teach that the photosensitive material is on a transparent support of variable optical index as described in column 5, lines 54-64 and that the photosensitive material is on a transparent support of variable thickness as described in column 7, lines 1-6. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the volume hologram as taught by Wood et al. in the device of Wood in order to obtain low surface spatial frequency of the hologram.

Response to Arguments

9. Applicant's arguments filed 14 October 2003 have been fully considered but they are not persuasive.

The Applicant argues that in regard to the 35 U.S.C. 112 2nd paragraph rejection (indicating that the first intermediate image being misdescriptive of the invention), that the claim has been amended such that the first and second intermediate images are located with respect to the user. Thus, with reference to Figure 3, the Applicant asserts that that first intermediate image 25 with respect to the user (the eye 3) is formed after the plane mirror 23 and the second intermediate image is formed after the diffractive mirror 21.

In response to this argument, the Examiner maintains the 112 2nd paragraph rejection in that the additional recitation that the intermediate images being located with respect to the user does not serve to further limit the claims nor addresses the issue with respect to how intermediate images would be formed in the claimed invention . First, the additional recitation of the intermediate images being located with respect to the user does not serve to further distinguish the claimed invention over the prior art in that an optical device for a helmet viewfinder or head up display, intermediate images would in one way or another be located with respect to a user (or eye) given the proximity of the user to the device. Furthermore, regarding the formation of the intermediate images, the specification and drawings do not teach light originating from eyepoint 3. Rather, the present disclosure teaches light emitted from the imager (i.e., screen 20) to ultimately impinge on eyepoint 3. Although the arrangement of elements may be described with respect to the eyepoint 3, light does not actually traverse the optical system in this "reverse" direction. Thus, the intermediate image 25 cannot be **formed** by off-axis spherical mirror 1 since light does not originate from eyepoint 3.

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This same argument applies to the recited "second intermediate image" being formed. Given the ambiguity surrounding the first and second intermediate images, the prior art is still interpreted as reading on the intermediate images such that the diffractive field mirror is situated in the vicinity of the intermediate image.

The Applicant further argues that given the additional recitation that the intermediate images being located with respect to the user, the prior art Wood '990 does not teach or suggest the claimed first and second intermediate images nor the diffractive field mirror situated in the vicinity of the second intermediate image.

In response to this argument, the Examiner cites the same arguments above in respect to the location of the user and in regard to the ambiguity of the formation of the first and second intermediate images.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. On January 21, 2004, the telephone number will be changed to (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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11 January 2004

Mark A. Robinson
MARK A. ROBINSON
PRIMARY EXAMINER